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WECHSLER COMPREHENSION IN SCHIZOPHRENIA

A THESIS

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BY

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ABSTRACT

In this study, an attempt was made to clarify the relationship between schizophrenia and comprehension, as measured by the Wechsler Comprehension test. Of the 300 subjects, 50 were hospital staff members, who composed the normal control group. The remainder were hospitalized mental patients. The research group of 120 included 50 catatonic, 40 paranoid, and 30 undefined schizophrenics. The patient control group of 130 subjects included 30 in the diagnostic category of affective psychosis, 50 psychoneurosis, and 50 pathological personality.

In all groups the WAIS Comprehension scores were higher than the Wechsler Full Scale and Verbal Scale means. The catatonic schizophrenics were inferior on Comprehension to both of the control groups. The paranoid group differed significantly only in comparison with the normal subjects. A higher proportion of the paranoids than of any other group had low Comprehension, relative to their mean scores; these low-scoring paranoid schizophrenics were found in the lower IQ levels. The undefined schizophrenics did not differ significantly from the control groups.

It is recommended that in future research on comprehension in schizophrenia, the content of the responses be analyzed, as well as test scores.

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CHAPTER I

INTRODUCTION

Impairment of comprehension is thought to be an important feature of some types of mental disorder. Is it a characteristic of schizophrenia? Many divergent views are found in the literature. Some say comprehension is impaired only in certain types of schizophrenia. Others maintain that schizophrenics in general are poor in comprehension. Still others assert that the schizophrenic's comprehension, on mental tests, is lowered only in comparison with his other verbal abilities. In addition there is evidence which suggests that there is no correlation between a diagnosis of schizophrenia and scores on tests of comprehension. This present study was an attempt to clarify the effect of schizophrenia on those functions related to comprehension.

If it could be established that there is a conclusive relationship between schizophrenia and impaired comprehension, diagnosticians could use this as one sign of the disorder. If the deficit is found only in certain types of schizophrenia, this finding would be of value in differential diagnosis. Information as to whether or not the schizophrenic's comprehension is lowered only in comparison with his other verbal abilities, or lowered relative to his over-all mental functioning, would also add something to the understanding of schizophrenia.

Survey of Previous Research with the Wechsler Test

Much of the research on intellectual impairment in schizophrenia since 1940 has been based on the Wechsler-Bellevue Scale.

The Wechsler Adult Intelligence Scale (WAIS), the revised form developed in 1955, has been used to a limited extent in such research. To the best knowledge of the present author, there has been no research published dealing specifically with WAIS comprehension in schizophrenia.

Between 1940 and 1950 much research using the Wechsler-Bellevue Scale was directed toward the development of diagnostic subtest patterns. The "scatter patterns" proposed for detection of schizophrenia frequently included a lowered Comprehension score. Research by Magaret (1942), by Pascal and Zeaman (1949), and by Harper (1950) all found Comprehension lowered in schizophrenia. Olch (1948) found Comprehension somewhat lower than over-all mean scores on the test, with, however, several other subtest scores still lower. Klein (1948) regarded lowered Comprehension as one of four best indicators of schizophrenic thinking. Rapaport (1945) developed diagnostic scatter patterns using Vocabulary, presumed to be most stable of the subtests, as the basis of comparison. He found his schizophrenic groups had lower average Comprehension scores. When these scores were compared with a restricted verbal mean, most of the groups were lower, but not all; chronic and deteriorated paranoid schizophrenics did not differ significantly. Rogers (1951), also using Vocabulary as a base, found schizophrenic patients very significantly lower on Comprehension when compared with neurotics.

Contrary findings were reported by other investigators. Gilliland (1943) found that Comprehension scores averaged higher in both schizophrenic and control groups. Rabin (1942) found Comprehension higher

than mean scores even among schizophrenics; it ranked as the second highest subtest within all his groups. In a later test-retest investigation of schizophrenic patients, Rabin (1944) found greatest variation on Comprehension as compared with all the other subtests.

Both Johnson (1949) and Levine (1949) found no consistent pattern in their studies. The latter found schizophrenics much more variable than normals. Kogan (1950) also found no significant relationship between subtest pattern and schizophrenia. In his study, Comprehension scores of schizophrenics ranked fourth out of ten subtests. Garfield (1949) noted that the rank order of subtests varied with age, education, and IQ level, as well as diagnostic sub-group. He concluded: "There does not seem to be any clear cut psychometric pattern that can be labelled 'schizophrenic.'"

Review of other Relevant Literature

One piece of research on schizophrenia, not based on the Wechsler tests, is of particular interest here. It was carried out by Binder (1956), using the SRA Tests of Primary Mental Abilities. He found severe over-all impairment on schizophrenic intellectual performance, but he did not find differential impairment.

Wechsler (1958), in summing up his test findings on schizophrenia, had this to say: "In addition to the impairment of mental efficiency, the schizophrenic is further characterized by a marked slowing up of his thinking, a loss in mental shift and a tendency toward perseveration. As often noted, he does much better on verbal tests. . . .

The verbal tests on which the schizophrenic does well (Information, Word definitions), are precisely those which do not require spontaneous verbalization. When they do make this demand, as in the case of the Similarities test, he is likely to fail. This failure is not due to a lack of either understanding or linguistic facility, but to a distortion in the patient's ideational processes. The schizophrenic misinterprets words just as he misinterprets reality, and his congruent replies, like his bizarre ideas, are a product of this misinterpretation."

The statement that the schizophrenic does not do well on tests requiring spontaneous verbalization suggests that such a patient might be expected to do poorly on the Comprehension test. Some of the questions may be handled by stereotyped answers, just as Information items may require only the recall of a well-learned fact, or a Vocabulary item only a familiar word synonym. However, adegate responses to most of the Comprehension items demand thinking about a practical problem, and expression of the solution in the subject's own words. The schizophrenic who is preoccupied with fantasy and reluctant to deal with external reality might be expected to find the Comprehension test especially difficult. How difficult would probably depend on the stage, type, and severity of his disorder. Such factors may be involved in the variable results obtained in research on schizophrenia. Wechsler (1958) comments on "the schizophrenic's unpredictability, so that now and again one finds some schizophrenic patients who do well on one or several of the tests which are characteristically failed by the typical schizophrenic."

Wittenborn (1949), in evaluating the use of Wechsler-Bellevue subtest scores in psychiatric diagnosis, makes this statement: "Marked variability in subtest scores has long been considered as an evidence for mental pathology. Subtest score variability has been particularly conspicuous among schizophrenic patients. . . .A great variety of published material may be adduced as evidence that certain types of pathology are commonly characterized by conspicuous failure in one or two kinds of mental functions. . . . The schizophrenic's poor judgment and seemingly capricious variability will produce a reduction of performance in these subtests which respectively draw on good judgment or a consistent application of effort." This statement seems to imply that the Comprehension score should be definitely lowered in schizophrenia. How then do we account for the inconclusive findings? Even if there is this differential impairment and fluctuation of mental activity and effort to which Wittenborn refers, there must be other factors. These may be related to the pre-morbid personality development and the degree of disintegration.

Mayman, Schafer, and Rapaport (1951) regard a relatively low Comprehension score as diagnostically significant; one of the scores that tend to drop more often and more dramatically in the records of schizophrenics than in other types of cases. Yet they find that in paranoid schizophrenia "the Comprehension score is not strikingly lowered--a feature distinctly paranoid in its implications once the diagnosis of schizophrenia has been established, since it reflects good preservation. . . . Because the chronic cases often have a 'good front' the

Comprehension score may be on a high level even though there may be peculiar verbalizations within the subtest." Reports of such diverse results from different types of schizophrenics emphasize the desirability of grouping patients, for research purposes, into as many types as can be clearly differentiated.

The view that it is fruitless to continue seeking diagnostic patterns from the mean scores of heterogeneous groups is expressed by Guertin, Rabin, Frank, and Ladd (1962). They urge instead, the search for model profiles of homogeneous clusters of patients. They believe these profiles would be of value in diagnosing patients with similar symptoms. They also stress the variety of factors which affect test scores, and recommend that research projects be designed to analyze the interaction.

Gurvitz (1951) has urged the qualitative assessment of the Wechsler Comprehension test, to complement the quantitative scoring. He considers a lowered score an important diagnostic indicator, often found in early or latent schizophrenics. Yet he finds that scores can be relatively good in some cases which reveal impaired judgment in their stereotyped replies. He rates failure on easy items, and bizarre and autistic responses among the important indicators of schizophrenia. There probably would be little argument about the importance of these indicators--when they are present. How to combine test scores with such analysis of content to produce an effective diagnostic instrument still remains a complex, unsolved problem.

Kahn and Giffen (1960) advocate the use of a variety of psychological tests in diagnosis, so that extensive comparisons can be made for

"common elements and consistent sign patterns." They enumerate the usual Wechsler signs of schizophrenia--which listing, incidently, includes a relatively low Comprehension score. They suggest that the "unequivocal" signs are likely to occur only when the schizophrenia is obvious; not in doubtful cases where psychological tests could be most useful. Unless some valid relationship has been established between the diagnostic "sign" and the factor it is supposed to indicate, it seems questionable that adding such signs together can produce a valid assessment.

Statement of the Problem and the Hypotheses

From the foregoing survey of previous studies of the relationship between schizophrenia and impaired comprehension, several possibilities emerge: Conflict in the findings suggests that there may be no causal relationship between schizophrenia and impaired comprehension. The correlation, when it is found, may be due to extraneous factors which produce systematic errors in some research projects. The second possibility is that a deficit in comprehension is related to certain types of schizophrenia, but not to others. Another is that lowered comprehension scores may be manifest only in relation to other verbal tests. Since schizophrenics are generally higher on verbal than on performance tests, it would be possible for a verbal score to be low relative to other verbal tests, and still remain at or above the mean of the combined test battery. Therefore Schizophrenic impairment of comprehension would be less likely to be revealed by a battery which includes performance tests.

These considerations lead to the formulation of the following hypotheses for investigation:

1. Relative to their Full Scale means, the scores of schizophrenics on the WAIS Comprehension test do not differ from those of other psychiatric patients, nor do they differ from those of normal persons.
2. Relative to their Full Scale means, the scores of some types of schizophrenics on the WAIS Comprehension test do not differ from those of other psychiatric patients, nor from those of normal persons.
3. Relative to their Verbal Scale means, the scores of schizophrenics on the WAIS Comprehension test are lower than those of other psychiatric patients, and also than those of normal persons.

CHAPTER II

METHOD

The WAIS Comprehension Test

The Comprehension test of the Wechsler Adult Intelligence Scale was selected as the most practicable measure of impaired comprehension. The Wechsler Scale is widely used, well standardized and is suitable for both normal and abnormal populations. It has eleven subtests, six of which compose the Verbal Scale, and the other five the Performance Scale. The weighted scores of all the subtests are directly comparable.

For purpose of this study, level of comprehension was defined by the subject's weighted score on the WAIS subtest. Each individual's Comprehension score has been compared with mean scores derived from his other subtest scores. Both Verbal and Full Scale comparisons were made. In effect, what was studied was the difference between the subject's actual Comprehension score and the expected score for a person of his intelligence level.

Description of the test. The WAIS Comprehension test consists of fourteen items, which include situational problems and proverbs (see Appendix A). The test is administered individually, and the subject's answers are recorded verbatim. This is necessary for the careful scoring of borderline responses, as well as for qualitative analysis. Adequate answers receive the full score; less adequate but not incorrect responses are given a half score. The test manual gives examples of various types of responses as criteria for scoring. Most answers can be scored readily.

Sometimes responses which are unusual or of borderline quality are difficult to classify. Here a subjective element inevitably enters into the scoring. Any scheme assuring completely objective scoring (such as multiple-choice answers) would nullify the value of an individual test demanding that the subject solve a practical problem in his own individual way; he must present his solution in his own words.

Rationale of the test. A succinct appraisal of the Comprehension test has been made, Gurvitz (1951). He said: "Wechsler has postulated that this test measures 'common sense' and that 'Success on the test seemingly depends on the possession of a certain amount of practical information and a general ability to evaluate past experience.' This appears to be one of the most cogent conclusions. While Comprehension will always be in deficit in the psychoses and severe neuroses, its main value is to indicate poor judgment in general."

In addition to the view quoted above, Wechsler (1958) describes the test by its factorial composition. In normal persons the major factors are verbal comprehension and g. Other factors contributing to the variance are verbal fluency, visualization, and numerical facility, as well as general reasoning. Wechsler is of the opinion that responses to the Comprehension test involve a greater number of mental factors in pathological than in normal groups. The test is one of those least affected by age. It is easily understood by persons with little education; although poor verbalizers tend to make lower scores.

The test can be evaluated by comparison of performance on the Comprehension and other verbal tests. Rapaport (1945) stated it thus:

"If a subject demonstrates that he possesses excellent Vocabulary and Information, but is very poor on Comprehension, we must conclude that he is not able to utilize to a full extent in life-situations his verbal facility and general knowledge, and we will be justified in considering that we deal with a case of impaired judgment." Rapaport goes on to equate "judgment," in psychiatric cases, with "reality testing" which he defines as "appropriate understanding of and reaction to reality." He further characterizes the concept of judgment as a function involving both the emotions and the intellect: "a proper emotional orientation brings to consciousness and to execution, out of the multitude of logical possibilities, that action which is labelled as one of 'good judgment.'" Logic may partially replace judgment in some highly intelligent and compulsive persons. Rapaport believes this sort of reasoning is seldom successful, that it usually leads to the presentation of many possibilities, doubt, and choice-conflict. "Goodjudgment is rather the efficient utilization of knowledge in a manner tuned to the whole situation." He seems to regard good judgment, or comprehension, as a function developed through example and experience rather than through direct teaching. However, a strict moralistic upbringing may enable a person to make the 'correct' response in many situations, giving an appearance of good judgment; his lack of real comprehension becomes apparent in situations demanding flexibility.

Wechsler (1958) refers to "social stereotypy" as one of the complex factors in the Comprehension test performance of clinical cases. Gurvitz (1951) also refers to the effect of "standardized, pat reactions" in

maintaining good scores in some cases of defective judgment. Rapaport (1945) asserts that good judgment, once it has been developed, can survive as a verbal stereotype long after judgment has been warped by maladjustment. This seems to be the case in some chronic schizophrenics who are able "to put up a good front." This factor of stereotypy complicates the interpretation of the Comprehension test scores.

Significance of the proverbs. The inclusion of proverbs in the 1955 version of the Wechsler Comprehension test is the chief difference between it and the older versions. Wechsler (1958) says: "The Proverbs were included in the comprehension series because of their reported effectiveness in eliciting paralogical and concretistic thinking. This finding was confirmed in the case of mentally disturbed subjects, but 'poor' answers were also common in normal subjects."

In a study done by Gorham (1956), using the Proverbs Test, he found highly significant differences between schizophrenics and normals, at all intelligence levels. However, he found the technique ineffective when applied to highly intelligent, chronic, paranoid schizophrenics. These findings suggest that the addition of the proverbs to the WAIS Comprehension test may make it a more discriminating instrument for the study of schizophrenia than was the much used Wechsler-Bellevue form.

Subjects and Their Classification

This study was done at the Provincial Mental Hospital at Ponoka. This hospital serves a large area of central and southern Alberta, which has an acute shortage of psychiatric beds in general hospitals, and lacks private treatment facilities. Consequently, nearly all patients requiring hospitalization are sent to the provincial hospital, regardless of the severity of their illness, or their socio-economic level.

As shown in Table 1, the three hundred subjects were divided into (1) a research group, composed of three types of schizophrenics; (2) a patient control group, which included three other psychiatric diagnoses; and (3) a normal group, made up of members of the hospital staff. The subjects ranged in age from eighteen to fifty years, inclusive.

Intelligence levels ranged from Dull Normal (IQ 80 to 89) on the Wechsler Scale to Very Superior (IQ 130 and above). Patients functioning at the Defective or Borderline levels (IQ below 80) were eliminated from the study. It was felt that such cases mightnot provide valid data. It was considered desirable to exclude the possibility of mental deficiency, and also cases so acutely ill that the validity of the test might be questioned.

The criterion for classifying the patients was psychiatric diagnosis. Usually this was agreed upon at a conference of the medical staff, after the patient had been in the hospital for at least several weeks. Patients in whom there was any suspicion of organic disease or brain damage were excluded, as were epilepsy, toxic conditions and addictions. Patients who had been treated with electro-convulsive therapy within a month prior to testing were also excluded.

All patients referred for psychological testing during the period of this study were included, if they met the requirements of diagnosis and minimum IQ. Most of the groups were augmented by cases drawn from the files; these had also been regular psychiatric referrals. Most of these cases were tested soon after admission or re-admission of the hospital. Some were tested when a change of treatment was under consideration; others to assist in rehabilitation planning.

Table 1

COMPOSITION OF GROUPS AND COMPARISON BY THE MEANS OF AGE, EDUCATION, AND WECHSLER IQ

GROUP	N	AGE	Yrs. of EDUC.	IQ
RESEARCH GROUP				
Combined Schizophrenic Group	120	29.9	9.2	96
Schizophrenia, Catatonic	50	27.0	9.3	93
Schizophrenia, Paranoid	40	34.5	8.8	95
Schizophrenia, Undefined	30	28.5	9.7	98
PATIENT CONTROLS				
Combined Group	130	32.7	9.6	103
Affective Psychosis	30	37.7	10.3	102
Psychoneurosis	50	34.3	9.4	103
Pathological Personality	50	28.0	9.5	103
NORMAL CONTROL GROUP				
Hospital Staff Members	50	25.8	12.0	109
Total number of subjects	300			
Means of all groups combined		30.4	9.9	101

in the affective psychosis, paranoid schizophrenia, and some of the other groups, additional patients were tested especially for this research project. These were cases which would not ordinarily have been tested: because they could be diagnosed readily, or because hyperactivity, or unresponsiveness, or suspiciousness of the patient made testing difficult. By devoting unlimited time to such patients (outside the psychologist's regular working hours), satisfactory Wechsler tests of a considerable number were completed. Thus a large sample was obtained from a more representative population than has been available in many other research projects of this kind.

The schizophrenic subjects were divided into catatonic, paranoid, and undefined subgroups. This last group included patients diagnosed "Undifferentiated Schizophrenia" because of mixed symptomatology, or less frequently as "Schizophrenic Reaction", when the break down had been recently precipitated. Within each of these subgroups there were gross differences in the etiology, stage, and severity of illness. Guertin, et al., (1962) urge the breaking down of broad diagnostic categories, for research purposes, into groups with relatively homogeneous symptom patterns. They suggest such criteria as chronicity, and reactive versus process. In this investigation an effort was made to further classify patients along such lines. It was abandoned because it seemed difficult to set up valid criteria, and impossible to evaluate some cases from the information available.

Part of the normal group was composed of male and female psychiatric nursing students who entered training in 1962.

The fact that they had been accepted after investigation, interviews, and extensive testing, was considered evidence of normality. The remainder of the normal group was made up of volunteer subjects from the hospital staff. These included graduate nurses and nursing auxillaries, domestic workers, and a variety of other employees. They were accepted as normal subjects if they had a record of satisfactory employment at the hospital for at least a year.

As Table 1 indicates, the normal group was on the average somewhat younger than the patient groups, and it had two or three years more education. An effort was made to balance the young nursing student group with older staff members having less than high school education. This attempt was only partially successful. Workers with no more than elementary education were particularly reluctant to be tested; few could be persuaded to volunteer. Table 2 shows how the seven subgroups varied with regard to age and sex. Table 3 gives the variations in educational level.

Administration and Scoring of the Test

The testing was done individually in rooms as private and free from distractions as possible. The complete Wechsler Scale was administered to each subject. Most of the patients were tested by the two staff psychologists between April and September of 1962. Some had been tested earlier. The normal subjects were tested by the investigator during the summer of 1962. Any difficult points in scoring were discussed with the senior psychologist. The scoring of the cases drawn from the files was reviewed to insure uniformity. No serious discrepancies were found in the scoring of the different psychologists.

Table 2

DISTRIBUTION OF SUBJECTS BY AGE, SEX, AND GROUP

AGE	RESEARCH GROUP Schizophrenia Catatonic		Paranoid		Undefined		PATIENT CONTROL GROUP Affective Psychosis		Psycho-neurosis		Pathological Personality		NORMAL CONTROL GROUP	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
48-50	1	-	3	1	-	-	3	5	3	2	-	-	-	1
45-47	-	-	2	1	-	-	3	1	2	3	2	1	-	2
42-44	-	1	-	1	-	2	1	1	1	4	1	-	1	1
39-41	-	1	1	-	1	1	-	-	-	2	2	-	-	2
36-38	1	1	3	-	1	1	1	1	3	2	7	2	-	-
33-35	6	1	2	3	1	3	2	-	4	-	-	-	2	2
30-32	3	2	5	7	2	3	4	1	3	4	3	1	1	-
27-29	6	3	2	5	-	2	-	1	2	2	1	1	2	3
24-26	1	-	1	1	1	2	1	-	3	1	10	1	3	2
21-23	7	4	2	-	1	-	1	1	6	-	3	-	9	2
18-20	9	3	-	-	5	4	2	1	-	3	11	4	7	10
TOTALS	34	16	21	19	12	18	18	12	27	23	40	10	25	25
	50		40		30		30		50		50		50	

Table 3

SUBJECTS CLASSIFIED BY EDUCATIONAL LEVEL

YEARS OF EDUCATION	RESEARCH GROUP			PATIENT CONTROL GROUP			NORMAL CONTROL GROUP
	Shizophrenia			Affective	Psycho-	Pathological	
	Catatonic	Paranoid	Undefined	Psychosis	neurosis	Personality	
13 or more	3	1	3	6	7	2	13
12	4	6	4	3	3	9	23
10 - 11	15	6	8	9	12	16	7
8 - 9	17	17	14	8	16	15	6
7 or less	11	10	1	4	12	8	1
TOTALS	50	40	30	30	50	50	50

CHAPTER III

STATISTICAL METHODS AND RESULTS

Statistical Procedures Used

Several one-way analyses of variance were applied to the data. These analyses were based on the difference scores of each subject--the difference between his weighted Comprehension score and his mean scores for various combinations of the Wechsler subtests. Where there were apparent differences between the means of the research and the control groups, *t* values were calculated using Dunnett's test for comparisons with a control (Edwards, 1960).

Chi-square tests were used to compare the number of cases, in schizophrenic and control groups, with high or low Comprehension scores, using various criteria.

Results and Their Relation to the Hypotheses

Table 4 summarizes the mean weighted Wechsler test scores for each of the seven subgroups, and for three combinations of these groups of subjects. Besides the Comprehension scores and standard deviations, the table presents the means of the Wechsler Verbal Scale (VS), Performance Scale (PS), and of the Full Scale (FS).

The table shows that the schizophrenic group as a whole tended to have lower Comprehension scores than the control groups. When subgroups are considered, the catatonic schizophrenics had the lowest scores, the paranoids next, and the undefined schizophrenic group was highest. ~~This last group of schizophrenics was also higher on Comprehension than were two of the patient control subgroups: the diagnostic categories labelled affective psychosis and pathological personality.~~

Table 4

COMPARISON OF GROUP MEANS ON THE COMPREHENSION TEST, AND ON VERBAL, PERFORMANCE, AND FULL WECHSLER SCALE MEAN SCORES

GROUP	COMPREHENSION Test		WECHSLER Scales		
	weighted scores	standard deviation	VS mean	PS mean	FS mean
SCHIZOPHRENIA					
Combined Groups	9.97	2.90	9.52	8.46	9.04
Schizophrenia, Catatonic	9.34	2.55	9.17	8.29	8.77
Schizophrenia, Paranoid	10.08	3.17	9.67	8.32	9.04
Schizophrenia, Undefined	10.87	2.80	9.87	9.05	9.51
PATIENT CONTROLS					
Combined Groups	11.62	3.44	10.54	9.73	10.17
Affective Psychosis	11.53	3.50	10.65	9.19	9.99
Psychoneurosis	11.92	3.72	10.81	9.58	10.25
Pathological Personality	11.36	3.06	10.20	10.20	10.20
NORMAL CONTROL GROUP	13.48	3.28	11.77	10.36	11.13
Means of All Groups Combined	11.27		10.33	9.34	9.88

The group of normal subjects were superior on the Comprehension test to all the patient groups.

The mean of the Wechsler scales in Table 4 show the same rank order, for the major groups, as the Comprehension scores. There is a general trend in all the groups to higher scores on the Verbal than on the Performance Scale. The one exception is the pathological personality group, in which the means of the two scales are equal. Among the schizophrenics the catatonics have the lowest means, the paranoids next, and the undefined group the highest Wechsler mean scores.

The analyses of variance. Table 5 presents the results of the five analyses of variance. The first analysis compared the Verbal Scale difference scores of the seven subgroups. The variance was significant at the .01 level. In the group of catatonic schizophrenics (SC) there was almost no difference between the Comprehension weighted scores and the mean of the verbal tests. The undefined schizophrenics (SU) had difference scores about one point higher; the paranoid schizophrenics (SP) were about midway between. The three subdivisions of the patient control group (PC) --Affective psychosis (Af), psychoneurosis (Pn), and pathological personality (PP) --all had mean difference scores similar to those of the undefined schizophrenics. The normal subjects (NC) had considerably higher scores than any of the other groups.

The first analysis of variance provided evidence of significant differences somewhere among the seven subgroups. Further analyses were done to determine just where there were significant differences between research and control groups.

Table 5

ANALYSES OF VARIANCE:

DIFFERENCES BETWEEN COMPREHENSION AND WECHSLER MEAN SCORES

IN SCHIZOPHRENIC VS CONTROL GROUPS

ANALYSIS	GROUP	N	MEAN	Variance estimate	Sig. level	Dunnett's 1-sided test for comparisons with a control: Groups compared	Value	Sig. level
#1 Differences between the Comprehension scores and the Verbal Scale mean	SC	50	0.15					
	SP	40	0.41					
	SU	30	0.97					
	PC Af	30	0.91					
	PC Pn	50	1.18					
	PC PP	50	1.16					
	NC	50	1.69					
All Groups		300	0.94	F = 3.64	< .01			
#2 Differences between the Comprehension scores and the mean of the Verbal tests-- excluding Comprehension	SC		0.30			PC - SC	t=2.49	< .05
	SP		0.54			PC - SP	--	N.S.
	SU		1.15			PC - SU	--	N.S.
	PC	130	1.33					
		N=250	0.98	F = 2.51	N.S.			
#3 Differences between the Comprehension scores and the mean of the Full Scale-- excluding Comprehension	SC		0.30			NC - SC	t=3.62	< .01
	SP		0.54			NC - SP	t=2.86	< .01
	SU		1.15			NC - SU	t=1.58	N.S.
	NC		2.12					
		N=170	1.06	F = 4.88	< .005			
#4 Differences between the Comprehension scores and the mean of the	SC		0.73			All differences N.S.		
	SP		0.90					
	SU		1.50					
	PC		1.65					
		N=250	1.33	F = 2.02	N.S.			
#5 Full Scale-- excluding Comprehension	SC		0.73			NC - SC	t=3.35	< .01
	SP		0.90			NC - SP	t=2.82	< .01
	SU		1.50			NC - SU	t=1.64	N.S.
	NC		2.53					
		N=170	1.44	F=15.48	< .005			

For these analyses the Comprehension subtest was deleted in the calculation of mean scores. Use of such modified means increased discrimination between performance on Comprehension and on the other subtests of the Wechsler Scale.

The second analysis of variance compared schizophrenics with the patient control group, on the differences between their Comprehension scores and their mean scores on the other five subtests of the Wechsler Verbal Scale. Only the catatonic schizophrenics differed significantly, at the .05 level. The third analysis used the same modified verbal mean, but the schizophrenics were compared with the normal group. Both the catatonics and the paranoids showed differences, significant at the .01 level. The foregoing differences support the third hypothesis: that relative to their Verbal Scale means, the scores of schizophrenics on the Comprehension test are lower than those of other psychiatric patients, and also than those of normal persons. The hypothesis was only partially confirmed, however, since the undefined schizophrenics did not differ significantly from the control groups.

The fourth and fifth analyses of variance were based on the difference between the Comprehension score and the mean of the other ten subtests of the Wechsler Scale. Analysis No. 4, comparing schizophrenics with the patient controls, showed no differences of any significance. This result supports the first hypothesis, so far as the comparison includes psychiatric patients only. The fifth analysis compared schizophrenics with normal subjects. As in the third, the catatonic and paranoid groups differed significantly (at the .01 level) from the normal controls, while the undefined schizophrenics did not.

This analysis does not support the first hypothesis. But since the group of undefined schizophrenics did not differentiate from either of the control groups, the second hypothesis was partially confirmed.

The Chi-square tests. The foregoing analyses of variance compared the mean difference scores of the research and control groups. The Chi-square tests compared the frequency of relatively high and relatively low Comprehension scores in the various groups.

Table 6 shows the number of cases in each of the subgroups and also in the combined research and control groups, which had Comprehension scores above or below each individual's mean scores. When Comprehension was compared with the Wechsler Full Scale mean, all groups had more cases above the mean. With one exception, the groups had a majority of cases with Comprehension above the mean of the Verbal Scale also. The exception was the group of catatonic schizophrenics. This group had twenty-two individuals with Comprehension above the verbal mean, and the remaining twenty-eight below.

Chi-square tests were done to determine the significance of the number of cases, in the various groups, with Comprehension above or below their mean scores. No. differences were found among the control groups. Table 7 presents the comparisons of schizophrenic groups, first with the patient control group, and second with the normal controls. Both Full Scale and Verbal Scale comparisons are shown. The combined schizophrenic group (Sch) had significantly fewer Comprehension scores above the mean in all four comparisons. But the striking feature of the table is the differentiation of the schizophrenic subgroups.

Table 6

NUMBER OF CASES IN EACH GROUP HAVING COMPREHENSION SCORES ABOVE OR BELOW THEIR WECHSLER SCALE MEAN SCORES

GROUP		FULL SCALE COMPARISON		VERBAL SCALE COMPARISON	
		Above mean (+)	Below mean (-)	Above mean (+)	Below mean (-)
SCHIZOPHRENIA	(Sch)	72	48	65	55
Catatonic	(SC)	28	22	22	28
Paranoid	(SP)	22	18	22	18
Undefined	(SU)	22	8	21	9
PATIENT CONTROL GROUP . . .	(PC)	94	36	89	41
Affective Psychosis . .	(Af)	25	5	19	11
Psychoneurosis	(Pn)	34	16	35	15
Pathological Personality	(PP)	35	15	35	15
NORMAL CONTROL GROUP . . .	(NC)	37	13	36	14

Table 7

CHI-SQUARE TESTS ON THE NUMBER OF CASES IN WHICH COMPREHENSION WAS GREATER THAN (+) OR LESS THAN (-) MEAN SCORES[a] IN SCHIZOPHRENIC VS CONTROL GROUPS

GROUPS COMPARED	FULL SCALE COMPARISON		VERBAL SCALE COMPARISON	
	Chi-square value	Sig.[b] level	Chi-square value	Sig.[b] level
Sch vs PC	4.27	$<.02$	5.39	$<.015$
SC vs PC	4.40	$<.02$	9.70	$<.001$
SP vs PC	4.11	$<.025$	2.44	$(<.06)$
SU vs PC	--	N.S.	--	N.S.
Sch vs NC	3.00	$<.05$	4.65	$<.02$
SC vs NC	3.56	$<.03$	8.05	$<.003$
SP vs NC	3.54	$<.03$	2.81	$<.05$
SU vs NC	--	N.S.	--	N.S.

Note.--No signigicant differences were found among any of the control groups.

[a]Data given in Table 6.

[b]One-tailed tests of the hypothesis that more schizophrenic than control subjects have Comprehension lower than their mean scores.

The undefined group did not differ significantly from either the patient controls or the normal control group. The other two schizophrenic subgroups did differ significantly. On the Full Scale comparison these differences were at the .02 to .03 level. The Verbal Scale comparison, however, sharply separated the catatonic from the paranoid type of schizophrenia. There were highly significant differences between the catatonic group and the controls. There was a much lower probability, around .05, that the paranoid schizophrenics differed from the control groups.

The same data (deviation of each subject's Comprehension score above or below his own mean scores) were further analyzed, using a different criterion for high or low Comprehension. Wechsler (1958) placed the limits of non-significant deviation of a subtest at 1.5 weighted score units above or below the mean of the remaining subtest scores. He classified scores more than 1.5 units above, as relatively good, high, or considerably above the mean. Those more than 1.5 units below, he classed as poor, low, or considerably below the mean. The Comprehension scores of the subjects in this investigation have been classified, using Wechsler's criterion, into low, average, and high scores. Table 8 graphically portrays the percentages of the three categories in each subgroup. The Verbal as well as the Full Scale mean has been used for comparison with the Comprehension test.

In Table 9 the number of subjects with low scores in the schizophrenic subgroups is compared with the number in each of the control groups, on the Verbal and Full Scales. Again the Chi-square test is used. The paranoid schizophrenics had significantly more low Comprehension scores in all four comparisons.

Table 8

PERCENTAGE OF SUBJECTS IN EACH GROUP HAVING LOW, AVERAGE, AND HIGH COMPREHENSION SCORES, WHEN THESE ARE COMPARED WITH EACH INDIVIDUAL'S FULL SCALE AND VERBAL SCALE MEAN SCORES

GROUP		COMPREHENSION Scores Compared with FS Mean			COMPREHENSION Scores Compared with VS Mean		
		Low	Average	High	Low	Average	High
SCHIZO-PHRENIC	SC	12%	60%	28%	16%	64%	20%
	SP	22%	38%	40%	27%	35%	38%
	SU	13%	37%	50%	17%	40%	43%
PATIENT CONTROL	Af	10%	33%	57%	10%	50%	40%
	Pn	4%	42%	54%	10%	42%	54%
	PP	14%	32%	54%	10%	44%	46%
NORMAL CONTROL		8%	30%	62%	10%	30%	60%

Note.--Low = Comprehension more than 1.5 weighted score units below the mean; Average = Comprehension from 1.5 below to 1.5 above; and High = Comprehension more than 1.5 units above the mean scores.

The difference was most significant when the paranoid group were compared on the Verbal Scale with the patient control group.

Table 10 compares the number of high Comprehension scores made by schizophrenic and control subjects. The undefined schizophrenics were not significantly different. The paranoid group differed significantly from the normal controls; the latter had more relatively high comprehension scores. The catatonic schizophrenics had fewer high scores than either patient or normal control groups, with the differences at a highly significant level in all four tests.

Table 9

CHI-SQUARE TESTS OF THE NUMBER OF CASES WITH LOW COMPREHENSION SCORES[a] IN SCHIZOPHRENIC AS COMPARED WITH CONTROL GROUPS

GROUPS COMPARED	FULL SCALE COMPARISON		VERBAL SCALE COMPARISON	
	Chi-square value	Sig.[b] level	Chi-square value	Sig.[b] level
SC vs PC	--	N.S.	--	N.S.
SP vs PC	4.98	.015	7.72	.003
SU vs PC	--	N.S.	--	N.S.
SC vs NC	--	N.S.	2.22	(.07)
SP vs NC	3.78	.03	4.66	.02
SU vs NC	--	N.S.	--	N.S.

[a]Data taken from Table 8.

[b]One-tailed test of the hypothesis that more schizophrenic than control subjects have low Comprehension scores.

Table 10

CHI-SQUARE TESTS OF THE NUMBER OF CASES WITH HIGH COMPREHENSION SCORES[a] IN SCHIZOPHRENIC AS COMPARED WITH CONTROL GROUPS

GROUPS COMPARED	FULL SCALE COMPARISON		VERBAL SCALE COMPARISON	
	Chi-square value	Sig.[b] level	Chi-square value	Sig.[b] level
SC vs PC	10.26	.001	9.85	.001
SP vs PC	2.61	(.053)	--	N.S.
SU vs PC	--	N.S.	--	N.S.
SC vs NC	11.67	.0005	10.76	.001
SP vs NC	4.31	.02	4.50	.02
SU vs NC	--	N.S.	2.10	(.08)

[a]Data taken from Table 8.

[b]One-tailed test of hypothesis that fewer schizophrenic than control subjects have high Comprehension scores.

CHAPTER IV

DISCUSSION

All groups in this research project had Comprehension scores above the mean of the other Wechsler subtests. The same finding has been reported occasionally in research done with the older Wechsler-Bellevue Scale (Rabin, 1942; Gilliland, 1943). In the present study, the elevation of Comprehension was most notable in the normal group. There was also a general tendency to higher verbal than performance test scores. Even among the subtests of the Verbal Scale, Comprehension proved to be an easier test, especially for the normal subjects.

This investigation was concerned with differences in comprehension between schizophrenics and other groups. It has provided evidence that catatonic schizophrenics exhibit lowered Comprehension scores when compared with normal subjects (Table 5). This was true when Comprehension was compared with all the other subtests of the Wechsler Scale; also when compared with the verbal subtests only. This Verbal Scale comparison also differentiated between the catatonics and the non-Schizophrenic patients. Relative to both of those Scales, and to both control groups, the catatonic group had markedly fewer cases with high Comprehension scores (Tables 7 & 10). To summarize: the catatonic schizophrenics comfirmed the third hypothesis; they did not support the first.

The paranoid schizophrenics were inferior to the normal control group on the Comprehension test. This was true whether their scores were compared with their means on either the Verbal or the Full Wechsler Scale (Table 5).

The paranoid group had fewer cases with relatively high Comprehension (Table 10). They differentiated from the other schizophrenics most notably in the greater number of cases with low Comprehension scores (Table 9). This characteristic was revealed in both the Verbal and the Full Scale comparisons with both the patient and the normal control groups. This finding contradicts the statement of Mayman, Schafer, and Rapaport (1951), that a distinctive feature of paranoid schizophrenia is that the Comprehension score is not strikingly lowered. It may be that the "well retained" Comprehension level referred to by these writers is characteristic of some restricted group of paranoid schizophrenics. In this investigation, the paranoids with relatively low Comprehension were (with only one exception) patients with intelligence scores below IQ 100. No evidence was found to support the idea that the Verbal Scale (rather than the Full Scale) mean would provide a better criterion for evaluating Comprehension in paranoid schizophrenia. The paranoid schizophrenics differed significantly from the normal group, but not from the patient control group (Table 5). Thus the third hypothesis was only partially supported; and likewise the first.

The undefined schizophrenic group did not differ significantly from either of the control groups, on any of the tests. This finding confirms the second hypothesis. It further emphasizes the importance, in research, of subdividing diagnostic categories, rather than treating them as undifferentiated groups of, for example, schizophrenics.

Other Trends Observed in the Data

Group variability. The distribution of difference scores (differences between Comprehension weighted scores and both Verbal and Full Scale means)

is graphically shown in Figures 1, 2, and 3 (Appendix B). The most extreme variation, and the highest Comprehension score, relative to the means of both Scales, occurred in the catatonic group (Fig. 1). Some of the lowest relative Comprehension scores were also found in this group. This might be construed as evidence that schizophrenics, particularly catatonics, are extremely variable. Yet it can hardly be considered a special 'sign' of schizophrenia, from the evidence available here. Other psychiatric patients (Fig. 2) and even normal subjects (Fig. 3) also showed much variations.

Inspection of the standard deviations of Comprehension scores (Table 4) does not suggest that the schizophrenics included in this research were more variable than the control groups. However, the schizophrenics would probably have exhibited much greater variability if cases falling below IQ 80 had been included. It was such low-scoring patients whose responses were most often affected by inattention, distractibility, and negativism. Since the sample chosen for this study excluded those cases most likely to show extreme variability, the evidence that schizophrenics are not more variable than other groups may be misleading. It may apply only to schizophrenics who score within the normal ranges of intelligence.

Comparison of different levels of intelligence. The mean Comprehension scores of each group and subgroup at various levels of intelligence is shown in Table 11.

This table presents absolute Comprehension weighted scores, rather than the difference scores previously treated. Of particular interest is the proportion of cases in each group falling in the lowest category used in this study, the Dull Normal, IQ 80 to 89. In the population on which the Wechsler Scale was standardized, 16 per cent were included in this class. None of the patient control groups, nor the undefined schizophrenics, exceeded this percentage. However, the catatonic and paranoid schizophrenics had more than double that proportion (38 per cent). This suggests that a greater proportion of patients suffering from these two types of schizophrenia probably manifest more severe intellectual impairment than do the patients in any of the other psychiatric groups here considered. The Wechsler test scores given in Table 4 reinforce this opinion.

When the range from IQ 100 and above is examined (Table 11), we find a much higher percentage of the paranoid and undefined schizophrenics than of the catatonics. In the group of fifty catatonic schizophrenics, the highest IQ scored was 115. All other groups investigated had individuals achieving scores ten to twenty points higher. About 10 per cent of the paranoid and undefined schizophrenics had IQs exceeding the highest reached by the catatonics; in the other patient groups it was 20 per cent. This suggests that especially in catatonic schizophrenia intellectual impairment is severe and general, and not confined to those most disturbed, or of inferior endowment, who function at below average levels.

Qualitative Assessment of Comprehension Test Responses

The disadvantages of merely quantitative research on schizophrenia,

Table 11

COMPREHENSION SCORES IN RELATION TO INTELLIGENCE LEVEL:

A COMPARISON OF GROUP MEANS

(Number of cases in parentheses)

GROUP		IQ RANGE					
		80 - 89	90 - 99	100-109	110-119	120-129	130+
SCHIZOPHRENIA	(120)	8.44 (38)	9.79 (44)	11.50 (24)	12.45 (11)	17.00 (2)	16.00 (1)
Catatonic	(50)	7.58 (19)	9.95 (20)	11.50 (6)	11.00 (5)		
Paranoid	(40)	9.15 (15)	9.50 (11)	11.55 (8)	12.75 (4)	17.00 (1)	16.00 (1)
Undefined	(30)	10.25 (4)	9.57 (14)	11.44 (9)	15.50 (2)	17.00 (1)	
PATIENT CONTROL	(130)	7.78 (19)	10.20 (35)	11.30 (37)	14.08 (24)	16.36 (14)	16.00 (1)
Affective Psychosis	(30)	7.40 (5)	10.13 (8)	11.50 (8)	14.00 (6)	18.00 (2)	16.00 (1)
Psychoneurosis	(50)	8.00 (8)	9.83 (12)	11.46 (13)	14.13 (8)	16.67 (9)	
Pathological Personality	(50)	7.83 (6)	10.53 (15)	11.06 (16)	14.20 (10)	14.33 (3)	
NORMAL CONTROL	(50)	9.67 (3)	10.20 (5)	12.53 (17)	14.44 (16)	16.56 (9)	
All Groups	(300)	(60)	(85)	(77)	(51)	(25)	(2)

became apparent during this investigation. Absolute scores do not take the patient's premorbid intelligence level into account (and there are rarely adequate test records available). Relative scores, such as used in this study, have the disadvantage that the criterion may also be severly affected by the illness. If the Vocabulary score is most stable (as claimed by Rapaport, 1945) it would be a more suitable basis of comparison than the mean scores used in this project. However, to learn much of value about schizophrenia from the Comprehension test it seems essential to analyze the quality of the patient's responses. More important than numerical scores is how the subject responds to the test items: which ones are most often failed, and why; also deviant responses and verbalizations, even when they do not result in total failure to score. Such research would complex and difficult. It was quite beyond the scope of this study. Nevertheless, this impression has resulted from the investigation: the only meaningful way to relate the Comprehension test to schizophrenia is through utilizing the content of the responses, as well as test scores.

CHAPTER V

CONCLUSIONS

Summary. Although all groups in this research had Comprehension scores higher than their Wechsler Verbal and Full Scale means, there were significant differences between groups. The catatonic schizophrenics were inferior on the Comprehension test, in comparison with both the patient and the normal control groups. Only in contrast to the normal subjects did the paranoid schizophrenics show definitely lowered Comprehension. A significantly higher proportion of the paranoids than of any other group had low Comprehension scores, relative to their mean scores. Nearly all of these low-scoring cases had IQs below 100. The undefined schizophrenics could not be differentiated in any way from the control groups.

Recommendations. The WAIS Comprehension test seems to be a suitable instrument for the study of comprehension in schizophrenia. However, the use of only the numerical scores is not adequate; too much valuable information is lost. In addition, some method of evaluating the content of the responses is needed. One important category would be responses that indicate autistic thinking. Another might separate stereotyped answers (which often merit the full score), into ones showing real comprehension, and merely reflexive responses. Additional inquiry would sometimes be necessary for such classification.

Another recommendation is that future research should use more homogeneous groups than those provided by present psychiatric diagnosis. For example, young adults who have functioned within the normal range until a recent and rather sudden schizophrenic episode, might be studied

in contrast to those who have never developed much social adequacy, and have progressed gradually toward complete breakdown. Schizophrenics who have been in a mental hospital for years might be compared with chronic patients who have been hospitalized intermittently, but have lived most of the time in the community.

In studying so complex a phenomenon as schizophrenia it seems desirable to consider various interrelated factors at the same time. To separate out these variables, more complex statistical procedures are necessary.

In this investigation, the attempt to match normal and schizophrenic groups on intelligence was unsuccessful, even though low-scoring patients were excluded. Such a restriction probably results in loss of important data. If a schizophrenic is presumed to be of potentially normal intelligence (as inferred from his test scores and his school and vocational achievements), it would seem reasonable to attribute a low intellectual level to the patient's disorder. Then one would not attempt to match research and control subjects on intelligence. However, it is recommended that low-scoring schizophrenics be studied separately, and compared with those functioning at higher levels of intelligence.

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APPENDICES

WAIS COMPREHENSION TEST

COMPREHENSION

DIRECTIONS Start with item 3 for all subjects. If *any one* of items 3, 4, *or* 5 is failed, administer items 1 and 2 before proceeding further.

Sometimes a subject finds it difficult to remember the entire question. In such an instance the examiner may repeat the question, but may not alter or abbreviate it. If it is necessary to encourage a subject, say **Yes** or **Go ahead.** If a response is not clear, add **Please explain further** or **Tell me more about it.**

If a subject gives no response after 10 or 15 seconds, the examiner should repeat the question.

DISCONTINUE After 4 consecutive failures (responses scored 0).

SCORING Items 1 and 2 are scored 2 or 0 points apiece; items 3-14 are each scored 2, 1, or 0. Credit 4 points for subjects to whom items 1 and 2 are not administered. See pp. 54-59 for specific scoring criteria and sample answers.

Maximum score: 28

Test Questions

1. Why do we wash clothes?
2. Why does a train have an engine?

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3. What is the thing to do if you find an envelope in the street that is sealed, and addressed, and has a new stamp?
4. Why should we keep away from bad company?
5. What should you do if while in the movies you were the first person to see smoke and fire?
6. Why should people pay taxes?
7. What does this saying mean? "Strike while the iron is hot."
8. Why are child labor laws needed?
9. If you were lost in the forest in the daytime, how would you go about finding your way out?
10. Why are people who are born deaf usually unable to talk?
11. Why does land in the city cost more than land in the country?
12. Why does the state require people to get a license in order to be married?
13. What does this saying mean? "Shallow brooks are noisy."
14. What does this saying mean? "One swallow doesn't make a summer."

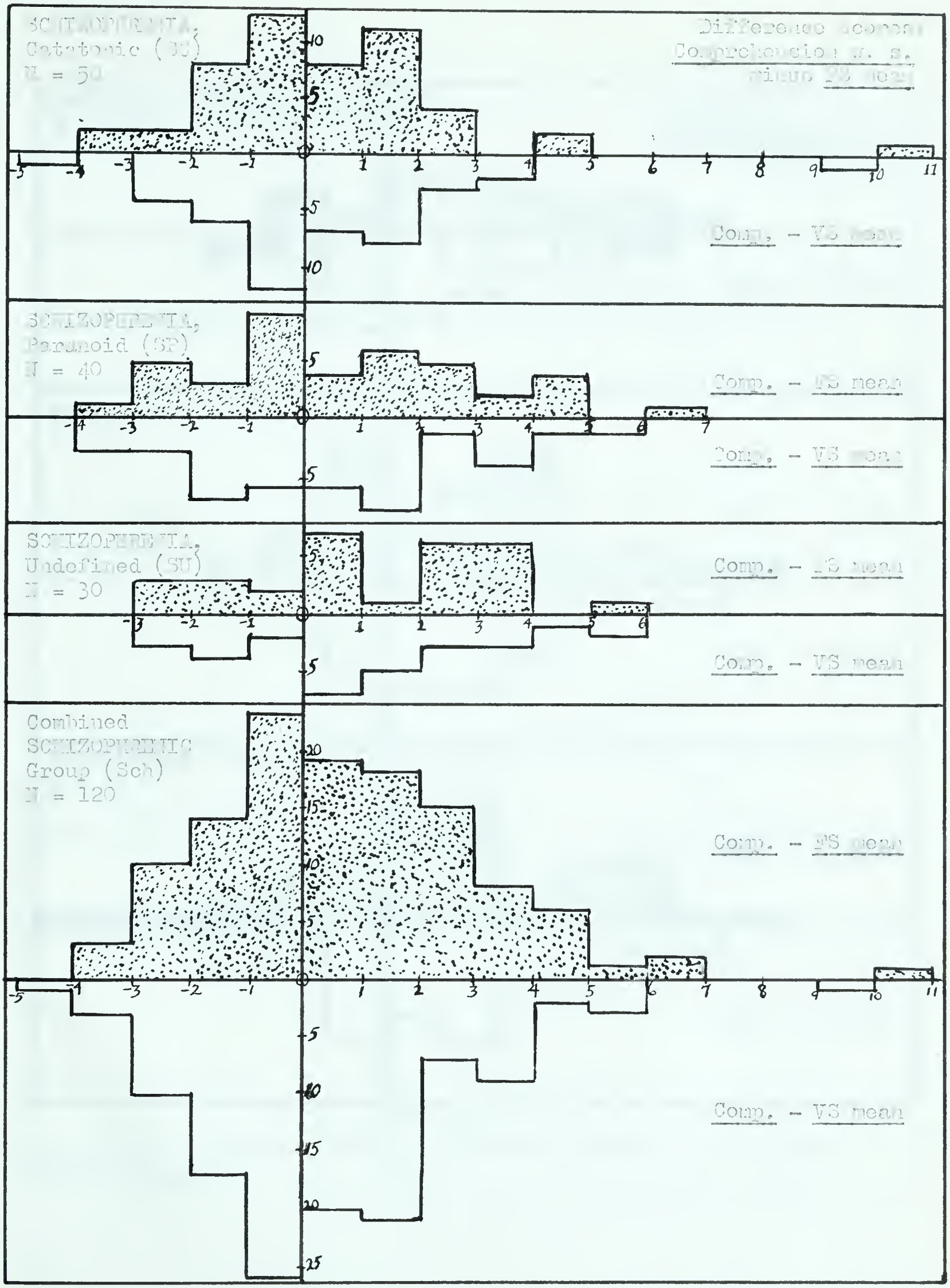

Fig. 1. Distribution of the difference scores of the separate and combined schizophrenic groups.

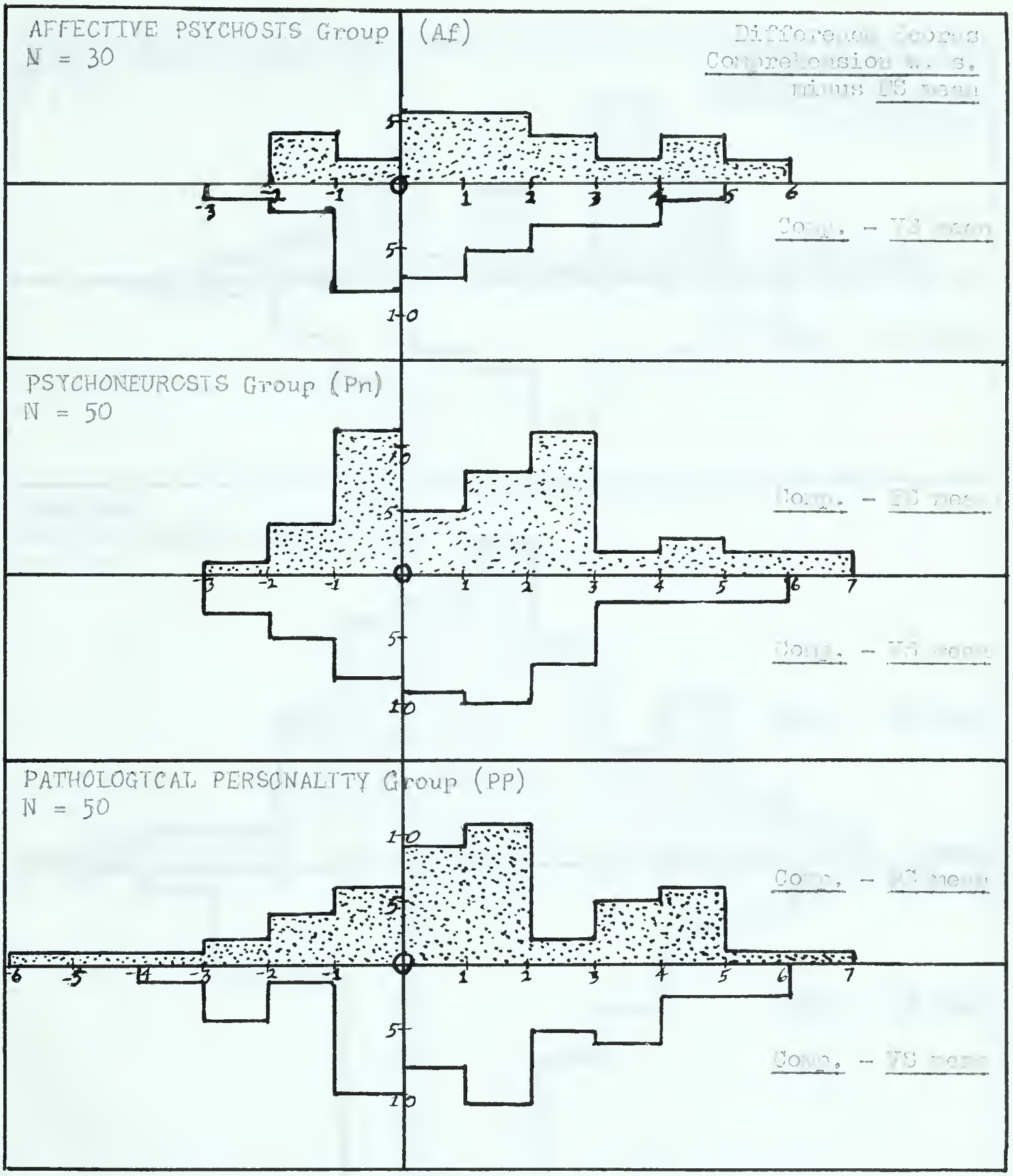

Fig. 2. Distribution of the difference scores of the patient control subgroups.

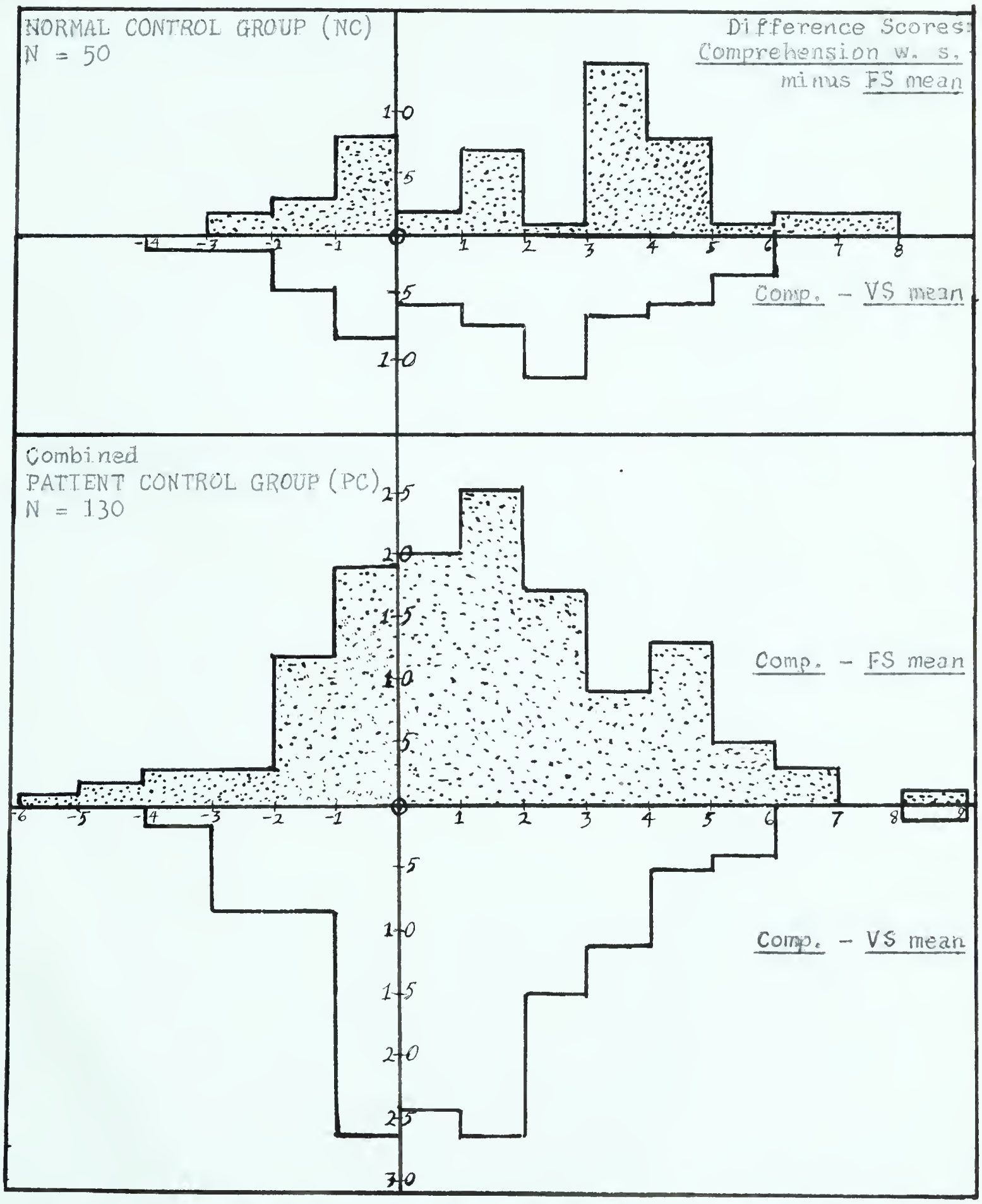

Fig. 3. Distribution of the difference scores of the normal and the combined patient control groups.